



T123™ Nickel Powder (CDN)

T123™ is a high purity nickel powder composed of discrete nickel particles having a spiky morphology. T123™ is produced by a unique carbonyl gas refining process at the Copper Cliff Nickel Refinery in Sudbury, Canada.

T123™ is recognized as an industry standard nickel powder for powder metallurgy applications:

- Spiky, needle-like texture designed specifically for powder metallurgy applications
- Tight size distribution optimized for easy mixing and excellent mechanical properties of sintered parts
- Uniform dispersion provides repeatable dimensional change of sintered parts
- Strengthens and toughens to improve fatigue strength
- Hardens heat-treated steels

T123™ is also widely used as a metal binder:

- Enhances corrosion resistance and toughness of hard metals
- Strengthens and toughens diamond tools
- Wets and aids the densification of tungsten heavy alloys

T123™ is produced in compliance with the following ISO standards: ISO 9001:2008.

For further information about our products, please visit our website (www.vale.com) or contact a regional sales representative.



136 kg drum



1 tonne bag

Typical Specifications

Form

- Fisher sub-sieve size: 3.5 - 4.0 μm
- Bulk density: 1.9 - 2.3 g/cm^3
- Sieve test: $\leq 0.1 \text{ wt\% } +100\#$

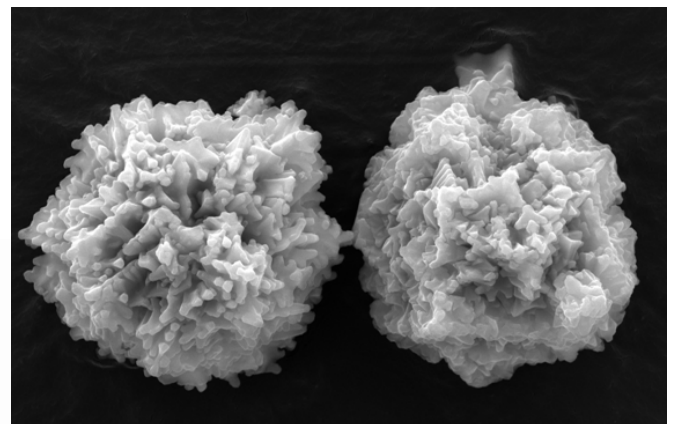
Packaging

- 136 kg steel drums, 8 drums per pallet
- 1 tonne bulk bags

Chemical Analysis (wt %)

	Typical	Max
Ni*	>99.8	--
Co	<0.00002	--
C	<0.0750	0.1
Fe	<0.0010	0.0014
S	<0.0001	0.0002
O	<0.0800	0.14
N	<0.0050	--

*Nickel determined by difference.



High resolution SEM image of T123™ nickel powder



T255™ Nickel Powder (Standard Grade)

T255™ is a high purity nickel powder with a fine, three-dimensional filamentary (“chain-like”) structure. T255™ is produced by a unique carbonyl gas refining process at the Clydach Nickel Refinery in the UK.

T255™ is recognized as an industry standard feed for the production of sintered rechargeable battery electrodes:

- Sinters readily to form a conductive, open porosity network
- Uniform size distribution and density results in controlled porosity in sintered electrodes and other porous structures
- Porosity-strength relationship of sintered T255™ is well understood, enabling tailoring of porous structure

T255™ is widely used as a conductive additive in:

- Batteries and fuel cells
- Pigments in coatings, especially for electromagnetic interference (EMI) shielding applications
- Polymers for electronic applications to provide electrical conductivity

T255™ is also used in powder metallurgical applications, as the filamentary structure can be broken down into fine primary particles.

T255™ is produced in compliance with the following standards: ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007.

For further information about our products, please visit our website (www.vale.com) or contact a regional sales representative.



75 kg drum

Typical Specifications

Form

- Fisher sub-sieve size: 2.2 - 2.8 μm
- Bulk density: 0.50 - 0.65 g/cm^3
- Sieve test: $\leq 2 \text{ wt\%} +100\#$

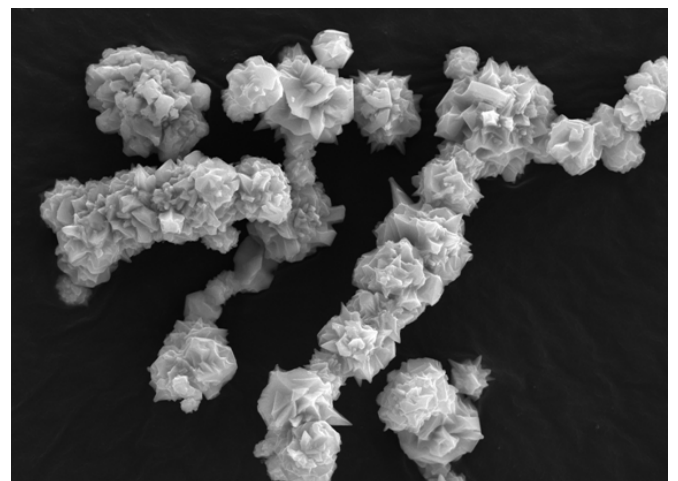
Packaging

- 75 kg steel drums, 6 or 12 drums per pallet

Chemical Analysis (wt %)

	Typical	Max
Ni*	>99.7	--
Co	<0.00005	--
C	<0.2000	0.25
Fe	<0.0030	0.01
S	<0.0002	0.001
O	<0.0750	0.15
N	<0.0100	--

*Nickel determined by difference.



High resolution SEM image of T255™ nickel powder